

Amendments to the Claims

Claim 1 (Currently Amended) An antenna device ~~wherein comprising:~~

a ground plate;

a first radiation plate having a ~~and a second radiation plate of which diameter, a~~ ~~or one~~ ~~side length or a diagonal length of~~ ~~is~~ ~~about 1/2 wavelength in electrical length~~ ~~are disposed at a~~ ~~distance from the~~ ~~on a~~ ~~ground plate at an arbitrary interval;~~ ~~and~~

a second radiation plate having a diameter, a side length or a diagonal length of about 1/2 wavelength in electrical length disposed at a distance from the ground plate, ~~wherein~~

~~the first radiation plate has~~ a first power feed port and a second power feed port provided on the first radiation plate ~~thereon, the first and second power feed ports being~~ ~~are disposed so that~~ ~~the straight lines linking a position of each of the first and second power feed ports~~ ~~port position and a~~ ~~the middle point of the first radiation plate~~ ~~are~~ ~~may~~ ~~be~~ orthogonal to each other,

~~the second radiation plate has~~ a third power feed port and a fourth power feed port provided on the second radiation plate ~~thereon, the third and fourth power feed ports being~~ ~~are disposed so that~~ ~~the straight lines linking a position of each of the third and fourth power feed ports~~ ~~port position and a~~ ~~the middle point of the second radiation plate~~ ~~are~~ ~~may~~ ~~be~~ orthogonal to each other, and

~~the two orthogonal straight lines of the first radiation plate are~~ rotated at ~~defined to have~~ an angle of 45 degrees with respect ~~to the two orthogonal straight lines of the second radiation plate.~~

Claim 2 (Currently Amended) The antenna device of claim 1, ~~wherein the first and second radiation plates are~~ formed as ~~nearly circular~~ and each has the ~~diameter~~ radiation plates ~~of~~ about 1/2 wavelength in electrical length.

Claim 3 (Currently Amended) The antenna device of claim 1, ~~wherein the first and second radiation plates are~~ formed as ~~nearly square~~ radiation plates and each has the ~~of which one side length or the diagonal length~~ of is about 1/2 wavelength in electrical length.

Claim 4 (Currently Amended) The antenna device of claim 1, wherein the ground plate is bent along a folded so that an arbitrary straight line located between the adjacent first and second radiation plates forms like a hill top.

Claim 5 (Currently Amended) The antenna device of claim 1, wherein the distance between the interval from the ground plate and a region of about 1/8 wavelength in electrical length from an end portion of each of to the first and second radiation plates in a region of about 1/8 wavelength in electrical length from the end portions of the first and second radiation plates is smaller narrower than the distance the interval from the ground plate to other regions of the first and second radiation plates in other region on the radiation plates.

Claim 6 (Currently Amended) The antenna device of claim 1, wherein
the first and second radiation plates each comprise a first base element at a region of about 1/8 wavelength in electrical length from an end portion thereof and a second base element at other regions thereof, and

a-the value obtained by dividing a-the relative permeability by a-the dielectric constant of the first-a base element between the ground plate and the first and second radiation plates plate in a region of about 1/8 wavelength in electrical length from the end portions of the first and second radiation plates is smaller than a-the value obtained by dividing a-the relative permeability by a-the dielectric constant of the second-a base element between the ground plate and the radiation plates in other region on the first and second radiation plates.

Claim 7 (Currently Amended) The antenna device of claim 1, wherein
the orthogonal straight lines of the first and second radiation plates divide each of the first and second radiation plates into four symmetrical quadrants,

each of the four symmetrical quadrants of each of the first and second radiation plates includes a four square slits slit,

each of the square slits has a pair of opposing sides parallel to each of the orthogonal straight lines of the respective first or second radiation plate line symmetrical to each straight line linking each power feed port and the middle point of the first and second radiation plates are provided in the radiation plates, and

each of the square slits has two adjacent sides, each of the two adjacent sides being located on a line perpendicular to one of the orthogonal straight lines line orthogonal to each and intersecting the one of the orthogonal straight lines line and two sides of four square slits contact with each other at a position positions of about 1/8 wavelength in electrical length from an the end portion portions of the respective first or and second radiation plates on each straight line plate.

Claim 8 (Currently Amended) The antenna device of claim 1, wherein a first system includes the first power feed port and the second power feed port are used in a first system, and a second system includes the third power feed port and the fourth power feed port power are used in a second system.

Claim 9 (Currently Amended) The antenna device of claim 1, wherein a first system includes the first power feed port and the third power feed port are used in a first system, and a second system includes the second power feed port and the fourth power feed port power are used in a second system.

Claim 10 (Currently Amended) The antenna device of claim 1, wherein the first, second, third and fourth each power feed ports are each respectively port is connected to one of the first and second radiation plates by way of gaps.

Claim 11 (Currently Amended) The antenna device of claim 1, further comprising at least one additional wherein three or more radiation plate as a third radiation plate, plates of which wherein the third radiation plate has a diameter, a or one side length or a diagonal length of is about 1/2 wavelength in electrical length are disposed at a distance from on the ground plate at a specific interval,

the third radiation plate has a fifth power feed port and a sixth power feed port, the fifth power feed port and the sixth power feed port being two power feed ports provided in each radiation plate are disposed so that as to cross each other orthogonally between the position of each power feed port and the straight lines line linking a position of each of the fifth and sixth

power feed points and a ~~the~~ middle point of the ~~third~~ radiation plates, ~~plate~~ are orthogonal to each other, and

the first and second radiation plates are adjacent to each other, the third radiation plate is adjacent to one of the first and second radiation plates, and the orthogonal straight lines of the third radiation plate are rotated at the power feed port positions of adjacent radiation plates and the straight line linking the middle point of the radiation plates may have an angle of 45 degrees from each other with respect to the orthogonal straight lines of the adjacent one of the first and second radiation plates.

Claim 12 (Currently Amended) An antenna device wherein comprising:

a ground plate;

a first radiation plate having a ~~and a second radiation plate of which diameter, a~~ ~~or one side length or a diagonal length of~~ is about 1/2 wavelength in electrical length ~~are disposed at a distance from the~~ ~~on a~~ ~~ground plate at an arbitrary interval;~~ ; and

a second radiation plate having a diameter, a side length or a diagonal length of about 1/2 wavelength in electrical length disposed at a distance from the ground plate, wherein

the first radiation plate has a first power feed port and a second power feed port provided thereon, on the first radiation plate are the first and second power feed ports being disposed so that the straight lines linking a position of each of the first and second power feed ports port position and a ~~the~~ middle point of the first radiation plate are ~~may be~~ orthogonal to each other,

the second radiation plate has a third power feed port and a fourth power feed port provided thereon, are disposed also on the second radiation plate in a similar positional relation, the third and fourth power feed ports being disposed so that straight lines linking a position of each of the third and fourth power feed ports and a middle point of the second radiation plate are orthogonal to each other, and

the first and second radiation plates are positioned with respect to each other so that another ~~the~~ straight line ~~one of (a)~~ links a ~~links the~~ middle point ~~between~~ of the first and second power feed ports, port and second power feed port and the middle points point ~~of the first and second radiation plate plates, and a middle point between the third and fourth power feed ports, or the~~ and (b) links straight line orthogonal to this straight line at the middle point of the first and second radiation plates plate and the straight line linking the middle point of the third

~~power feed port and fourth power feed port and the middle point of the second radiation plate or the straight line orthogonal to this is parallel to a straight line passing through the positions of the first and second power feed ports and a straight line passing through the positions of the third and forth power feed ports at the middle point of the radiation plate are present on an identical straight line.~~

Claim 13 (Currently Amended) The antenna device of claim 12, wherein ~~a plurality of radiation plates of which diameter or one side is about 1/2 wavelength in electrical length are disposed on the ground plate at an arbitrary interval, two power feed ports provided in each radiation plate are disposed so that the power feed ports may cross each other orthogonally with the straight line linking with the middle point of the radiation plate, and each straight line linking the middle point of two power feed ports of each radiation plate and the middle point of the radiation plate are present on an identical straight line~~ the first and second radiation plates are positioned with respect to each other so that the other straight line (a) links the middle point between the first and second power feed ports, the middle points of the first and second radiation plates, and the middle point between the third and fourth power feed ports.

Claim 14 (Currently Amended) The antenna device of claim 12, wherein the first and second radiation plates are formed as nearly circular and each has the diameter ~~radiation plates of about 1/2 wavelength in electrical length.~~

Claim 15 (Currently Amended) The antenna device of claim 12, wherein the first and second radiation plates are formed as nearly square and each has the ~~radiation plates of which one side length or the diagonal length of line~~ is about 1/2 wavelength in electrical length.

Claim 16 (Currently Amended) The antenna device of claim 12, wherein the ground plate is bent along a folded so that an arbitrary straight line located between the first and second adjacent radiation plates forms like a hill top.

Claim 17 (Currently Amended) The antenna device of claim 12, wherein the distance between interval from the ground plate and a region of about 1/8 wavelength in electrical length from an

~~end portion of each of to the first and second radiation plates in a region of about 1/8 wavelength in electrical length from the end portions of the radiation plates is smaller narrower than the distance interval from the ground plate to other regions of the first and second radiation plates in other region on the radiation plates.~~

Claim 18 (Currently Amended) The antenna device of claim 12, wherein

~~the first and second radiation plates each comprise a first base element at a region of about 1/8 wavelength in electrical length from an end portion thereof and a second base element at other regions thereof, and~~

~~a value obtained by dividing a the relative permeability by a the dielectric constant of the first-a base element between the ground plate and the first and second radiation plates-plate in a region of about 1/8 wavelength in electrical length from the end portions of the radiation plates is smaller than a the value obtained by dividing a the relative permeability by a the dielectric constant of the second-a base element between the ground plate and the radiation plates in other region on the radiation plates.~~

Claim 19 (Currently Amended) The antenna device of claim 12, wherein

~~the orthogonal straight lines of the first and second radiation plates divide each of the first and second radiation plates into four symmetrical quadrants,~~

~~each of the four symmetrical quadrants of each of the first and second radiation plates includes a four-square-slits slit,~~

~~each of the square slits has a pair of opposing sides parallel to each of the orthogonal straight lines of the respective first or second radiation plate line symmetrical to each straight line linking each power feed port and the middle point of the radiation plates are provided in the radiation plates, and~~

~~each of the square slits has two adjacent sides, each of the two adjacent sides being located on a line perpendicular to one of the orthogonal straight lines line and intersecting the one of the orthogonal to each straight lines line and two sides of four square slits contact with each other at positions of at a position about 1/8 wavelength in electrical length from an the end portion portions of the respective first or second radiation plates on each straight line plate.~~

Claim 20 (Currently Amended) The antenna device of claim 12, wherein a first system includes the first power feed port and the second power feed port are used in a first system, and a second system includes the third power feed port and the fourth power feed port power are used in a second system.

Claim 21 (Currently Amended) The antenna device of claim 12, wherein a first system includes the first power feed port and the third power feed port are used in a first system, and a second system includes the second power feed port and the fourth power feed port power are used in a second system.

Claim 22 (Currently Amended) The antenna device of claim 12, wherein the first, second, third and fourth each power feed ports are each respectively port is connected to one of the first and second radiation plates by way of gaps.

Claim 23 (Currently Amended) An antenna device wherein comprising:

a ground plate;

a first radiation plate having a and a second radiation plate of which diameter, a or one side length or an axial length of is about 1/2 wavelength in electrical length are disposed at a distance from the on a ground plate at an arbitrary interval,; and

a second radiation plate having a diameter, a side length or an axial length of about 1/2 wavelength in electrical length disposed at a distance from the ground plate, wherein

the first radiation plate has a first power feed port and a second power feed port are provided in a the peripheral area thereof of the first radiation plate, a first straight line linking a position of the first power feed port provided on the first radiation plate and a the middle point of the first radiation plate being is orthogonal to a second straight line linking a position of the second power feed port and the middle point of the first radiation plate,

the second radiation plate has a third power feed port and a fourth power feed port provided thereon, a third straight line linking a position of the a third power feed port provided on the second radiation plate and a the middle point of the second radiation plate being is orthogonal to a fourth straight line linking a position of the a fourth power feed port provided on the second radiation plate and the middle point of the second radiation plate, and

an the electrical length of the first straight line and an the electrical length of the third straight line are identical in length, an and the electrical length of the second straight line and an the electrical length of the fourth straight line are the identical in length, the electrical length of the first straight line and the electrical length of the second straight line are different in length lengths, and the first straight line and the third straight line or the second straight line and the fourth straight line are present on different lines.

Claim 24 (Currently Amended) The antenna device of claim 23, wherein ~~three or more radiation plates are provided further comprising at least one additional radiation plate.~~

Claim 25 (Currently Amended) The antenna device of claim 23, wherein the ~~first and second radiation plates are formed in elliptical and each has shape of which length of one of a major axis and a minor axis with the axial length of~~ is about 1/2 wavelength in electrical length.

Claim 26 (Currently Amended) The antenna device of claim 23, wherein the ~~first and second radiation plates are formed in rectangular and each has shape of which length of one of a major axis and a minor axis with the axial length of~~ is about 1/2 wavelength in electrical length.

Claim 27 (Currently Amended) The antenna device of claim 23, wherein ~~the longer sides or major axes of the first and second adjacent radiation plates cross each other orthogonally.~~

Claim 28 (Currently Amended) The antenna device of claim 23, wherein the ~~first and second radiation plates have are formed in a shape in which a the gap between the ground plate and each of the first and second radiation plates is wider at a position of about 1/8 wavelength in electrical length from the end portions portion of the first and second radiation plates on a straight lines line linking each of the first, second, third and fourth power feed ports port and the respective middle point of the first and second radiation plates.~~

Claim 29 (Currently Amended) The antenna device of claim 23, wherein ~~the first and second radiation plates each comprise a base element, and~~

a the value obtained by of dividing a the relative permeability by a the dielectric constant of the a base element between the ground plate and each of the first and second radiation plates plate is designed to be larger at a position of about 1/8 wavelength in electrical length from the end portions portion of the first and second radiation plates plate on the straight lines line linking each of the first, second, third and fourth power feed ports port and the respective middle point of the first and second radiation plates plate.

Claim 30 (Currently Amended) The antenna device of claim 23, wherein

the first and second straight lines divide the first radiation plate into four symmetrical quadrants,

the third and fourth straight lines divide the second radiation plate into four symmetrical quadrants,

each of the four symmetrical quadrants of the first and second radiation plates includes a four square-slits slit,

each of the square slits of the first radiation plate has two opposing sides parallel to the first straight line and two opposing sides parallel to the second straight line,

each of the square slits of the second radiation plate has two opposing sides parallel to the third straight line and two opposing sides parallel to the fourth straight line,

each of the square slits of the first radiation plate has two adjacent sides, one of the two adjacent sides being located on a line perpendicular to the first straight line and intersecting the first straight line line symmetrical to a straight line A linking the power feed port and the middle point of the radiation plate are provided in the radiation plates, and a straight line B orthogonal to the straight line A contacts with two sides of each slit at a position point of about 1/8 wavelength in electrical length from an the end portion of the first radiation plate on the straight line A and another of the two adjacent sides being located on a line perpendicular to the second straight line and intersecting the second straight line at a position about 1/8 wavelength in electrical length from an end portion of the first radiation plate, and

each of the square slits of the second radiation plate has two adjacent sides, one of the two adjacent sides being located on a line perpendicular to the third straight line and intersecting the third straight line at a position about 1/8 wavelength in electrical length from an end portion of the second radiation plate and another of the two adjacent sides being located on a line

perpendicular to the fourth straight line and intersecting the fourth straight line at a position about 1/8 wavelength in electrical length from an end portion of the second radiation plate.

Claim 31 (Currently Amended) The antenna device of claim 23, wherein the ground plate is bent along a folded so that an arbitrary straight line located between the first and second adjacent radiation plates forms like a hill top.

Claim 32 (Currently Amended) The antenna device of claim 23, wherein the first power feed port and the third power feed port are connected to a high frequency circuit in a first system, and the second power feed port and the fourth power feed port power are connected to a high frequency circuit in a second system.

Claim 33 (Currently Amended) The antenna device of claim 23, wherein the first power feed port and the third power feed port are connected to a reception circuit, and the second power feed port and the fourth power feed port power are connected to a transmission circuit.

Claim 34 (Currently Amended) The antenna device of claim 23, wherein the first, second, third and fourth each power feed port ports are each respectively is connected to one of the first and second radiation plates by way of gaps.